Instructions: Complete each of the following exercises.

Introduction to Functions of Several Variables

1. Consider the functions $f(x,y) = \cos(x+2y)$ and $g(x,y,z) = \sqrt{x} + \sqrt{y} + \sqrt{z} + \ln(4 - x^2 - y^2 - z^2)$.
   (a) Evaluate $f(2,-1)$ and $g(1,1,1)$.
   (b) Compute the domain and range of f.
   (c) Compute the domain and range of g.
2. Sketch graphs of the following functions.
   (a) $f(x,y) = \cos(x)$ (b) $g(x,y) = y$ (c) $h(x,y) = 2 - x^2 - y^2$
3. Complete Problem 14.1.32 in the textbook (matching functions to their graphs).
4. Complete Problem 14.1.38 in the textbook (make a contour map of a given function).
5. Draw a contour map of the functions below, showing several level curves.
   (a) $f(x,y) = x^2 - y^2$ (b) $f(x,y) = xy$ (c) $f(x,y) = \dfrac{y}{x^2+y^2}$
6. Complete Problems 14.1.61 through 14.1.68 in the textbook (match a function with its graph and contour map).
7. Use a computer to graph $f(x,y) = x^2 + cxy + y^2$ for various $c \in \mathbb{R}$; how does the shape change with changing c?
8. Let $g(t)$ be a single variable function and $f(x,y) = g(\sqrt{x^2+y^2})$. Describe the graph of f.